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ABSTRACT

This career booklet presents nine short biographies of women who began studying as mature students--after working or staying at home with their families--and were able to develop new careers in the less traditional female areas of work in technology and engineering. Aimed at women in their 30s and 40s, the booklet illustrates ways in which women can take advantage of opportunities for retraining and new work, and encourages women who want to develop a technical career to do so. It is noted that the Open University technology faculty has been working to increase the proportion of women students in science and technology, and to encourage women to consider retraining with technological careers in mind, either through the Open University or other educational organizations. (CGD)

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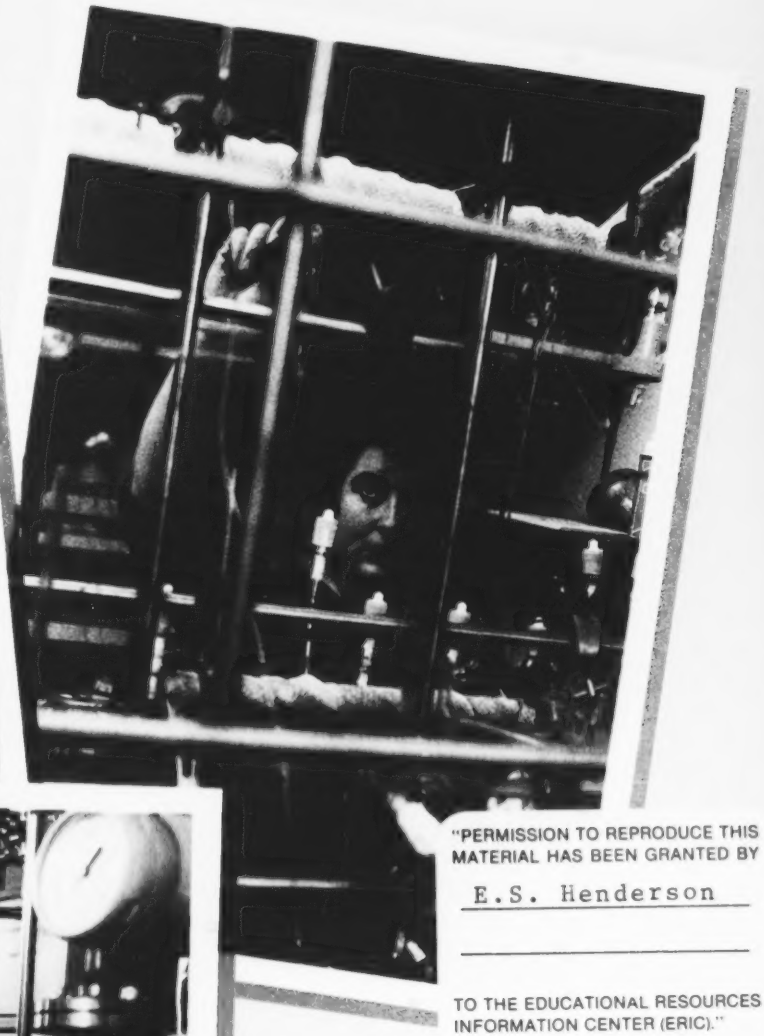

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Career-wise: a fresh start in technology..... women tell their stories

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The Open University

Career-wise: a fresh start in technology..... women tell their stories

by Gill Kirkup
(Lecturer in Educational Technology)

Foreword by the Baroness Platt of Writtle
(Chairman of the Equal Opportunities Commission)

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For information on short courses please write to: The Associate Student Central Office, The Open University, PO Box 76, Milton Keynes, MK7 6AN.

Further copies of this booklet may be obtained free of charge from:
The Women into Science and Engineering Group, Technology Faculty, The Open University, Walton Hall, Milton Keynes, MK7 6AA.

Contents

Foreword ____ 4

Preface ____ 5

Jo Davies ____ 6

Rose Deakin ____ 8

Lorna Uden ____ 10

Mary Hunt ____ 12

Ches Lincoln ____ 14

Sue Davies ____ 16

Mary Shackleton ____ 18

Frances Day ____ 20

Joyce McBride ____ 22

Foreword

It is with great pleasure that I write the introduction to this careers booklet. Very often women did not have opportunities of work or education in non-traditional fields when they were young. Often they worked in dull routine jobs demanding minimal educational qualifications. As their personalities developed, possibly through promotion in their careers and taking on new responsibilities, they realized they had qualities and talents which they had not recognized earlier. Later perhaps, after marriage, while raising a family and running a home, they exercised managerial skills, often without realizing it, and began to have ambitions for higher goals in their subsequent careers.

This is where the Open University, perhaps allied to courses in local further education colleges, comes in. Today it is possible to achieve educational qualifications, including degrees, by taking short courses coupled with home-based or distance learning on a modular part-time basis over a period of years at the student's own pace.

There is no doubt that the application of technology is entering into all fields of work: travel, tourism, manufacture, banks, the retail trade, hospitals – the list is endless. In the past women have not felt capable of understanding and controlling the applications of technology. Today this is no longer true.

Through the completion of present-day Open University and further and higher education courses, many women have demonstrated that they are capable of putting their knowledge into action, and achieving worthwhile careers where skills such as theirs are in short supply. When women are technically competent they are just as valuable as men in their control of modern technology and can achieve promotion too.

I embarked on an engineering career in the field of aeronautics during the war, and found myself able to cope with the very varied demands made on my understanding of the subject in those days. I very much enjoyed the jobs I held and working in what was then an almost entirely male environment. I hope the experience of the women described in this booklet will encourage other mature women to launch out into new and non-traditional fields of work with the confidence that they, too, if they have perseverance and enthusiastic motivation, can achieve qualifications so that they can enter new and satisfying careers which will bring them happiness and prosperity in their future lives.

Baroness Platt of Writtle

Preface

At a time when the structure of employment is being altered dramatically by economic and technological change, women in their thirties and forties who want to develop a new career or return to work after some years at home have problems knowing what opportunities exist and how best to take advantage of them. This is especially so for women who want to abandon the traditionally female areas of work and enter those fields described broadly as technology and engineering. Fields which, because they are themselves in the process of restructuring, are more open than they have ever been to enthusiastic mature women. The purpose of this booklet is to encourage such women into these fields and to show through real-life examples ways in which women can take advantage of opportunities for retraining and new work.

The nine short biographies presented here are all of women who had worked and in some cases had also been at home with children for some years, but who then began studying as mature students and were able to develop new careers in technology and engineering. They include systems engineers, software managers, an ergonomist, a computer programmer, lecturers in electronics and computer science. No attempt was made to find women working in a wider range of technological work, and the careers included here may demonstrate that particular kinds of jobs are more open to mature women entrants.

The women themselves are spread geographically over England and Wales. They span an age range from early thirties to late forties; some are married, some divorced, some have children, some don't. The one thing they have in common is that they have all been Open University students, and some are still studying. The Open University has been an important source of education for women: in 1985 45.3% of all undergraduate students were women. However, there is a much smaller percentage of women students studying technology (16%) than other subject areas: for example 65% of all arts students are women. A group of people within the Technology Faculty of the University has been working over the last few years, with some success, to increase the proportion of women students in science and technology. The idea to produce this booklet came from that group, the Women into Science and Engineering (WISE) Group. We hope that readers will be encouraged to consider retraining with technological careers in mind, and information on Open University undergraduate and short courses can be obtained from the address at the front of this booklet. However, we also hope that the booklet will prove useful to women thinking of studying through organizations other than the Open University.

We have been encouraged in our work by the initiatives of the Equal Opportunities Commission in the area of women and technology. This booklet has been financed jointly by the Open University and by a grant from the Commission. This grant will enable us to distribute the booklet to a wide audience.

I would like to thank all the women here who gave so much of their time to be interviewed and to read and correct drafts of the text. I am especially grateful for the willingness of each one to talk about her personal difficulties and her struggle to study and to have the career she wanted. I have tried not to present an unnaturally rosy picture of the successful career woman, but to show some of the costs, for example the long working hours that are the price of career success. At the end of the interviews I was struck by the fact that although all the women are earning good incomes relative to the average earnings of women generally, none regarded high salaries as a priority. Their earnings were important to them – for some their own earnings were their sole income – but even more important was the sense of achievement and satisfaction gained from doing interesting work well. I only hope I have captured this enthusiasm and satisfaction on paper.

Gill Kirkup

Jo Davies

Jo Davies is 33 years old and her qualifications include a BA (Open) and a Higher National Certificate in computer studies. She works as an avionics systems analyst with the emphasis on human engineering (the human–computer interaction). She is employed by EASAMS, a systems company, to work on military contracts, developing software (programs of instructions to the computer) for the visual displays and controls used by pilots and navigators of fighter aircraft. A large part of her job involves working with aircrew on an aircraft cockpit simulator.

Her job is demanding and although she usually works a 9.00 to 5.30 day, she has to make regular visits to other companies which require an overnight stay. When she first started she was the only woman in her unit, but she now has a new woman graduate working directly for her. She earns a good salary. And yet Jo only began her Open University study when she was 27. Between then and leaving school she had found it difficult to decide what she really wanted to do and made several false starts.

Jo comes from a family of teachers. Her father was a headmaster, her sister is a teacher and she thought, when she was young, that this was what she wanted too. At school her only concern was to get enough 'O' and 'A' levels to go to teacher training college, which she did at 18. However, as soon as Jo got there she began to have doubts. At first she thought she was simply studying the wrong subjects. The geography wasn't challenging enough and the maths faculty said her 'O' level wasn't adequate, so she was sent to the arts faculty. Here she found herself like a duck out of water and became increasingly unhappy. Her tutor advised her to have a break for a year while her place was held. She realized her family, especially her father, would be disappointed, but she knew it was the right thing to do. And in order to demonstrate that she wasn't a complete failure she went out and found herself a job.

The title of Jo's first job was, grandly, a 'mathematical assistant' at EMI; she, more bluntly, describes it as a figure clerk, and all she was expected to do was to put figures into mathematical models, but the company also trained her in computer programming. She enjoyed the job enough to have no wish to take up her college place again. After working with EMI for two years Jo left and married her boyfriend from school-days.

Her husband's experience was in retailing, and together they moved to Bedfordshire to manage a sweet shop. Unfortunately the job paid so badly that after six months they returned to Middlesex. Jo was lucky enough to be able to go back into her job in EMI because of staff shortages, but the six months in the sweet shop had been very unsettling. Jo now found her old job boring, and there were no prospects for promotion. She began to question again whether she was doing what she really wanted to do. She began to look for other jobs but was not really qualified for anything. One day while visiting an employment agency she applied for and got a job as an interviewer in the agency. This was a job Jo found challenging and rewarding and she went through a series of promotions during the three years she was with the company, ending up managing a branch of her own. But at 24 she was still dithering about her future and feeling increasingly unhappy with the middleman image of the agency.

She decided that although the engineering industry was less exciting than the agency in terms of personal contact, the academic environment was more interesting and it involved more brainwork. So when her husband found a job in Camberley, Jo applied to EASAMS who offered her a job working in a trials team as a technical assistant. Although she had been away from engineering for three years, her computer training was easily recalled. When two of the engineers with whom she worked closely left the company she found herself taking on more of their work. Jo began to see that she was doing the same job as the

graduate entrants, but did not have their status or their salary. Her supervisor appreciated her work and tried to get her re-graded as an engineer, but the promotion system couldn't cope with such a case. So, Jo investigated training schemes for non-engineers and the company agreed to sponsor her for an Open University degree. In 1979 Jo began studying the technology foundation course and a course on mathematical modelling.

Jo found the studying difficult and time-consuming, but she got lots of encouragement and help from her colleagues. During the first year of her study the company gave her the engineer status she wanted so much, but by then OU study had become more than a means to an end – it was a personal goal. During her years of studying she tailored her subjects to suit her job. The systems courses were directly relevant to the job she was doing and there was constant cross-fertilization between the job and the studying. The psychology course provided a good foundation to the human engineering aspects of the job and the digital computer course enhanced her computing knowledge.

Unhappily, everything was not smooth in Jo's life. As she worked hard on her OU courses her married life became more strained. Her husband hadn't wanted her to do an OU degree and he resented the time taken up by her study. As their relationship deteriorated Jo became more absorbed in her OU work. Her husband hated the idea of summer school so much that for the first year she didn't go. When they separated Jo took over the house and the financial responsibility that went with it. Jo was then in the middle of her degree and absorbing herself in study helped her to escape from the financial and emotional pressure she was under. The OU became something secure and comfortable she could rely on. Her studies even helped her approach her own situation from new angles: on one of her systems courses she did a project on marriage as an example of a system failure.

At one point Jo decided she needed more practical computing than the OU could give, so she began a two-year HNC course in computer studies, going to college one day a week on day-release. The two years when she was studying for both the HNC and the OU degree were very hard – made harder by the fact that her company presumed that she had given up her degree studies and were passing her over for promotion. Jo finally got her HNC and OU degree. EASAMS realized her worth and she got rapid promotion and commensurate increases in salary.

Jo is now a senior engineer and loves the job. She had been doing the work and attending meetings appropriate to the job for some time before the company gave her the corresponding status in grading. Her area of work, avionics, is seen as a man's world and, as a woman and not even a graduate, her credibility was in question. She was constantly being checked and feels that she had to perform as well if not better than the men in order to earn their respect. At meetings now she is normally the only woman present and has finally achieved recognition in her own right.

The engineering world has a reputation for not taking women seriously. Jo describes overhearing two male engineers talking on a train. One asked the other whether his children would follow him into engineering. The second replied 'Good grief, no: they're girls!' Jo had to face up to the male chauvinism of the company's customers, in particular the RAF, whose officers are simply not used to being given instructions by women. She has had to put up with a lot of jokes and leg-pulling at her expense. Her boss once said 'The only difference between Jo and the other engineers is that she wears lumpy jumpers!' Despite all of this most of her male colleagues have been extremely supportive. Jo also wonders whether being a woman while trying to learn has advantages. She has always been able to get help and advice from other people – perhaps, she thinks, because she is less of a threat than a man would be in the same situation. Jo also thinks that women have 'the art of making mistakes gracefully' as she calls it!

Jo hasn't got any plans for her immediate future work. She set herself a goal six years ago which she has now achieved. She enjoys the challenge of working in engineering and she looks forward to new tasks and perhaps leading a team. She would like the chance to go to more conferences and widen her network of colleagues.

In the meantime, Jo carries on a variety of hobbies and sports. She goes potholing regularly and is an active member of the MG car club. She enjoys cycling during the summer and belongs to a vintage bicycle club. Once a week she does weight training and aerobics and plays hockey at the weekends. She belongs to an amateur dramatic society and gets involved both on and behind the stage. She is the sort of person who likes to be doing things and finds that the more pressure there is on her the more she gets done.

When encouraging other women to embark on a new career or study, Jo emphasizes the importance of determination and the willingness to give up your spare time. She also stresses the need to keep the final goal in sight. For her the whole process of the degree has been about self-esteem. She compares the sense of achievement to that of mountain climbing or marathon running – the going is tough but worth it at the end. □

Rose Deakin

Rose is 48 years old and the mother of three children aged 21, 19 and 14. She is also a systems consultant and software manager for Transam, a long-established British manufacturer of microcomputers and dealer in business systems, where she has been working for five years. During this time she has written four books, one of which, *Women and Computing* (Papermac), examines what opportunities for employment exist for women in computing. During her career Rose has moved from arts to social science, through statistics to computing, acquiring an OU degree on the way. She is now working in a field she would never have imagined herself entering when she was at school, doing a job which didn't exist at that time.

At school, Rose didn't know what sort of work she wanted to go in for. She went to a private girls' school, where she enjoyed history and English, and so did well in them. She was bad at languages and, like many schoolgirls, poor in science and maths. So, without thinking much about it she went on to university to study her best subject, history. But, by the time she graduated she was no clearer about what she wanted to do, and the sorts of openings available to history graduates didn't tempt her much. Her father had always been involved in various kinds of social reform movements and the only career she felt drawn towards – that of some kind of social work – she was completely unqualified to enter. However, because her father was encouraging and willing to support her financially, she studied for a social science diploma. This time when she qualified she got a job with the South London Family Services Unit, working with some of the poorer families in London trying to break cycles of deprivation. She loved the work, and found herself part of a dedicated and optimistic team, where she stayed until she had her own children. She felt that the job was simply too demanding to manage while also coping with the demands of young children.

Between the birth of her first and second children Rose did bits of part-time work and voluntary work. After the birth of her second child she got a part-time teaching job doing social studies at a polytechnic. She then got a job as an interviewer on a research project studying delinquency. She wanted to be more involved in the work but needed to know much more about statistics. At this time her husband had also begun a new job with the Greater London Council where he too needed to use more statistics than he was used to. He decided to take an OU course and encouraged Rose to take it with him, since, he argued, she was pretty much unemployable without it. In the event he backed out: pressure of work! Rose began the maths foundation course in the first year of its existence in 1971. She also had a third baby that same year.

Rose found the maths course extremely difficult and it took her two years to complete it. People were sympathetic because of the new baby, but Rose admits that the baby was just an excuse. In reality she found the subject matter very hard; she even wondered if her brain simply wasn't capable of further expansion. Despite this, she kept her target – statistics – in view. She had done the foundation course because she thought she needed to know the underlying maths. She then struggled through a computing course, *An Algorithmic Approach to Computing*. The fact that these courses were so difficult came as quite a shock to Rose. At school and university she had always been near the top of the class in her chosen arts subjects; now she was just scraping through and knew she was at risk of failing. She felt humiliated at first but she kept going, taking statistics courses then some psychology, until she completed her degree. By the time her youngest child was starting nursery school Rose began looking for a job again. There were no advertisements for the type of work she wanted, but, rather than sit back and hope, she went on the attack and wrote to all the people she knew who themselves might know of something. In this way she got herself a research job, but not one which used any of her new skills. Later this led to another job analysing data with the aid of a large computer package. Here began the acquaintance with computers. Although at first she was worried about whether she was competent to do the job, she got going, and soon had new ideas of what she could do with the research data. She was learning all the

time, and found herself applying some of her OU maths and computing knowledge. She left after two years. By then she had decided that she enjoyed the computing rather than the research, and she discussed the possibility of working in computing with the people in the university computing unit where she had done the research. They were very encouraging: 'Nobody starts with computing,' they told her; 'everybody has come from somewhere else.'

Rose weighed up her position and felt it didn't look hopeful. She was already over 40 and was hoping to enter a new career doing part-time work because her children were quite young. No one, she felt, would take her on as a trainee operator or programmer under those circumstances. At this point she was given some very useful advice: to get involved with microcomputers, where the market was new and just expanding, and where consequently few people knew much. Rose's own experience had shown her that people who use computers always need advice to use them well, and big computers always have an advisory service. 'Why not a similar service for microcomputers?' she thought.

With financial support from her parents and her husband, Rose bought a microcomputer and spent a year at home teaching herself how to use it, and learning to program in Pascal. She remembers that much of her time was spent on the telephone or back at the shop because there were so many problems, and instruction manuals were so confusing. The people at the shop were very interested in what she was trying to do, and at the end of the year offered her a job with them. They wanted her to put together a software catalogue, that is, to find good business programs that would run, or could be made to run, on the equipment they were selling. It took Rose six months to do it. Every package needed to be modified slightly for the equipment, then tested and evaluated for its faults. Her job was crucial to the success of the business since there was so much competition between the different makers of microcomputers, and since those which sold best were the ones with the most varied software packages. And this was how she became a software consultant.

Because Transam, where Rose now works, is a small firm, everyone in it tends to be multifunctional, turning their hand to whatever they are good at and whatever is needed. Staff also work quite long hours. Rose's working day is 9–10 hours; although formally finishing at 5.00 pm she is almost always there until 6.00 pm, and she often has work to do over the weekend. She describes lunch as 'conceptual', usually a sandwich at her desk. Her salary is good: £16 000 including a company car, and the advantage of cheap computers etc., for her personal use. Rose doesn't think she works harder than anyone else: 'It's a hard-working industry,' she says. What she likes about the work is that there is always something new to learn, and although she sometimes wonders whether she might not be getting too old to work this hard, whenever she gets a bit fed up something new and exciting happens. For example, a new piece of equipment is designed, and her interest is kindled again. The worst part of the job she finds is commuting through central London.

Rose's work is divided into specific areas of responsibility. One aspect entails looking at software packages, evaluating them and deciding which ones the company should sell with their equipment. The company have to be able to give support to customers who buy the packages as well as training in their use. For this part of her work Rose needs commercial sense. Another major part of her work is talking to customers, making sense of their requirements, and working out a solution for them. For this she uses the interview training she had many years ago. A third major area is training people to use hardware and the software. Two of the books she has written are teaching texts: *Database Primer* and *Exploring dBASEII* (Century). The final part of her work she describes as promotional and managerial. This is where she is able to use the skills and experience which she acquired through her original arts background and also through being older than her colleagues. She uses her writing skills to help initiate publicity material and she uses her wide-ranging experience to help solve all sorts of problems; she often knows where to look for answers when others are stuck.

Looking back on her career, Rose sees that the crucial factor was the emotional and financial support her parents gave her, especially in buying her first microcomputer. Her mother, in particular, advised her never to stay in a job where people didn't think well of her because she would not do well in such an atmosphere. Her husband supported her in theory, and also financially during the year at home with the micro. But, in common with most men in high-powered jobs, he was able to be of little practical help in the house. Because she has almost always worked, there has been enough money to have someone help in the house, even if only for a few hours a week. Rose describes herself as an awful housewife. She jokes that it's best to have a paid job so that you then have an excuse for being so bad at housework. She also recommends a paid job as being a way of protecting yourself from all kinds of demands that friends and family make on you if they feel you have 'nothing to do' all day!

Her children have always taken her work as a matter of course. She has had periods of feeling guilty about not being a good mother. Now she believes that for a woman guilt is a part of life and you just have to find a balance between guilt and your own desires. She feels that her children are proud of her. Two of them have shown a strong interest in new technology, which pleases her because she was afraid that her own involvement might make them react against it as a mark of independence.

Rose feels that an ideal time to study or retrain is while your children are young, and before you go back to work full-time and become dependent on the money. Because of its flexibility the OU is one of the best ways to study.

Rose recommends the new technology industries highly for women. When she first got involved she met very few other women but she feels that women are actually very good with microcomputers. Women know how to make them work for them. They are good at picking up new ideas, and good at selling things. She feels women are put off by a mystique rather than by difficulty. And she feels that working in technology is something of a confidence trick – that is, you need the trick of having confidence in yourself, and you will be surprised at how many other people have confidence in you too. □

Lorna Uden

Lorna works for a further education college in Birmingham as a lecturer in computer science. She took the job in January 1984 and although she finds certain aspects of it extremely frustrating she has at last got a job with a good salary (roughly £10 000 per annum) *and* the sort of holidays that allow her to spend more time with her 14-year-old daughter, Abigail, and her husband.

Lorna has not only changed careers in the course of her life – she has also changed continents and cultures. She is Chinese and was born in Sarawak, Malaysia, where she went to school. At school she felt that she wanted to do something with her life, to go to university at least, but as she grew up she saw that there would be little chance of getting there, and she gave up the idea. She feels that in her part of the world the education of women is valued much less than it is in Britain. Her parents expected her to marry and stay at home, whereas her four brothers were expected to develop professional careers. Although her 'O' level subjects included mathematics, she had not specialized in sciences and had no particular ambition, and it was more practical to find a training course that would accept her and for which she could get a grant.

She went to Singapore to train in dental therapy and when she finished she returned to Sarawak and practised as a dental therapist for four years. At this point she met her future husband, who is British, through a mutual friend. Her parents were very opposed to her marrying outside her culture, and to complicate relations further she had been converted to Christianity before she went to Singapore, and was now committed to a religion that was not that of her parents. When she left Malaysia to come to Britain she left without their goodwill, but over the years she has won them round and communicates regularly by air mail and occasional phone calls.

Lorna came to Britain to get married and began to study at the Bible Institute in Birmingham, because she wanted to know more about her new religion. She intended to go back to work in dentistry, but then Abigail was born, and she stayed at home for a year or two. After a while she began to find staying at home frustrating and began a refresher course in dentistry. Her mother-in-law looked after Abigail from Monday to Friday during the three months of the course. She found it very difficult both at an emotional and at an organizational level to arrange child care but she believes her daughter suffered no ill effects and it allowed her to take up her career again.

She then found a dental therapy job for three days a week in a school clinic in Birmingham where she worked for five years. Her daughter attended a day nursery, where she was very happy. At that time Lorna began to be frustrated with her career as she couldn't go any further, and so she decided she needed to start studying again. She came across the OU by seeing television programmes and decided to apply. She didn't get much support at first from her friends and family. Her husband wasn't sure that she would either find the time or have the basic educational level to continue. But she was determined. She registered for the foundation course in social science, thinking it might be the easiest place for her to start. She enjoyed it tremendously but wanted a bigger challenge, and with an eye to the future she decided science and technology courses might enhance her career prospects.

Her husband had not been keen at first, and told her that if she failed her first year she would have to give it up, but as she went on successfully from year to year, he became much more supportive, helping her in the house and being proud of her achievements. A major problem she was aware of was that her evening studying affected his social life, as she was not free to go out with him as much as he would have liked. But even this he accepted over time.

She next took the foundation course in science and followed it with a course in mathematical modelling to get herself the mathematical background she felt she was

lacking. Ultimately it was two computing courses that inspired her to change her career completely. She enjoyed them so much that she decided to specialize in computing as she realized the tremendous significance of the 'computer revolution' which was just beginning.

She enquired at the universities of Birmingham and Aston, and found that the latter was just beginning an honours course in computing. They accepted her OU credits as eligibility for entry and she began at Aston as a full-time student in 1978.

Lorna enjoyed full-time study although she was the only mature student on the course and one of only two women students. Because of her extra responsibilities it was very hard work. She had to arrange for her daughter to be taken to and collected from school since she was in lectures until 5.30. Then when the other students settled down to a relaxed social life in the evenings, she rushed home to make meals and be with her family. She found it lonely on the course, especially when the other woman student was absent. Although the two of them supported each other, the other student was young and therefore leading a completely different personal life. She found lecturers at Aston less encouraging than those she had met in the OU; she also found that they tended to talk down to students. This wasn't her only experience of being a lone woman in a male environment. She had experienced it while studying with the OU. The year she did a materials course, she found herself to be the only woman on the summer school. At first the male students thought it odd that she was there, but as she went on doing the same work as they did she became accepted.

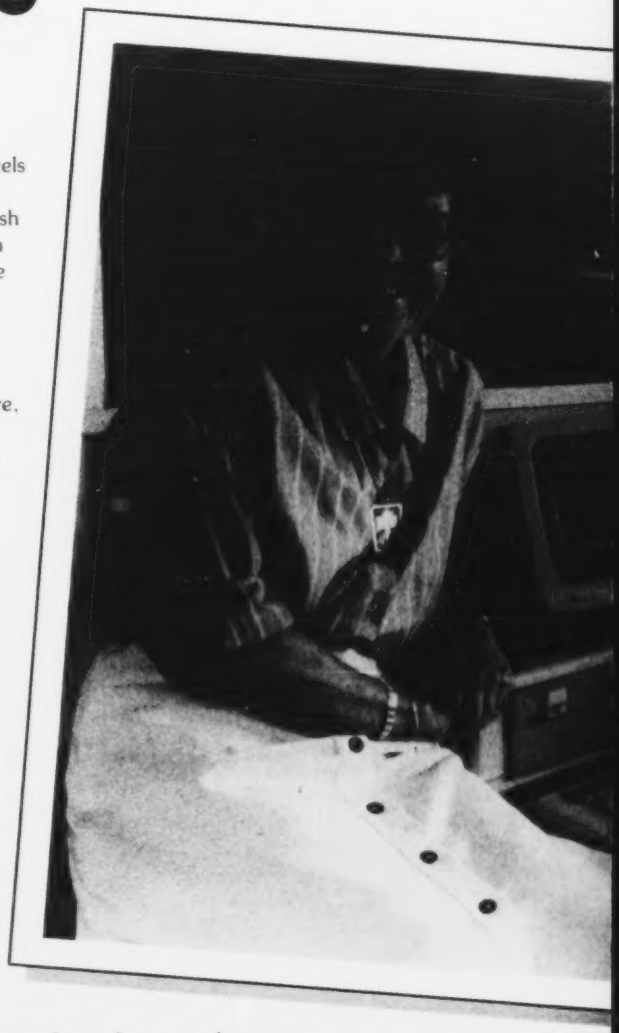
When Lorna finished at Aston, she was immediately offered jobs, but had to refuse the first two because they were too far away from her home. When she began applying for jobs she found male interviewers tended to think of a woman applicant for a technical post as something of an oddity and she found herself having to answer many totally irrelevant questions. The first job she took was in Coventry as a development engineer working on the design of microcomputer systems for applications to oil refineries and gas works. She worked there for nearly a year and gave it up in the end because of the strain of commuting. She had to be up at 5.30 am to catch a 6.50 train to be in work by 8.10 am. The work itself she found interesting and rewarding. Again she was the only woman in her section, and when she went out of the office to any other part of the factory people thought she was a typist or from the assembly line. Her colleagues found it unusual at first too, since they had never before worked with a woman in her position. They became embarrassed if they swore in her presence, and apologized. Both she and they became much more relaxed when they began to take her for granted and swear without embarrassment!

Lorna changed jobs and went into commercial programming to be nearer home. But she didn't enjoy it, and she still had the problem of not having enough time off when her daughter was on holiday from school. Her daughter began to complain of being dumped, and Lorna looked for a way of spending more time with her and keeping a career. It was then she turned to teaching. She went to work in an information technology education centre creating teaching materials and courses, and although the hours were much improved, the holiday allowance was still only four weeks a year. Over the years she and her husband had developed a system where they took holidays with their daughter but separately from each other. They decided they would like a holiday together too. When she saw a job lecturing in further education she applied immediately and was successful.

Although Lorna enjoys teaching at the moment, she feels she has reached another block in her career. She can't get any further and she feels that even in education there is discrimination against women for promotion. Because she has a BSc (Aston) and a BA (Open) and industrial experience she knows she is one of the best qualified people in the college in her field, but she feels she isn't always treated as such. She is tempted to return to industry but is unwilling to do so until her daughter is older.

Lorna offers as much encouragement as she can to women embarking on a career similar to her own. She has a few women students every year and tries to encourage them, but is often disappointed because so many give up and go back to typing. She hopes to begin work soon on a special women's technology training course in her own institution, encouraged by her head of department. She feels that women don't take up challenges even though they are quite competent to succeed in them. She is aware of the isolation that pursuing such a career entails. She now has the support of both her husband and her daughter. Her daughter sees studying as part of life but friends still find it unusual; and other women in particular, she finds, are less supportive than men to her working in a male career. She knows many people would think that changing careers is risky but she believes that when you find yourself blocked and frustrated it is by far the best thing to do. And technology, she argues, is not as difficult as it sounds; she's a firm believer that what men can do, women can do, although you really have to be determined. Make up your mind and go ahead, she recommends. □

Mary Hunt



Mary has established herself as a human factors engineer (also called an ergonomist), a job which combines the skills of psychology and anthropometry in the study of people's interaction with their working environments. She is also the Open University Students Association representative on the Technology Faculty Board, and a mother of two daughters, both of whom are at university. She is a real enthusiast for 'systems thinking', and would like to do a master's degree in this field. At the moment, however, she wants to complete her BA (Open) Honours degree, which is only one half-credit away. Her career change is quite dramatic, having spent her early working life as a secretary and much of her thirties and forties interspersing work as a full-time housewife/mother with periods of secretarial work. She now earns a comfortable salary and finds that the most satisfying perks of her job are travelling and meeting people as well as the credit she is given for her expertise.

Mary left school at 17, with a General School Certificate and an ambition to travel. Her girls' grammar school believed that the appropriate jobs for girls were in teaching, nursing, hairdressing and secretarial work. She opted for secretarial work because the others did not appeal to her, and there seemed to be no other choices.

Her first job was in a bank. This she found pretty unfulfilling, even though she worked in foreign exchange in the West End of London and in the City at Eastcheap. She then went into a local government office and enjoyed the extra responsibility required of the job. However, in her mid-twenties, Mary met an ambitious, highly qualified young physicist whom she married within a year of their meeting. Her first baby, Alison, changed Mary's life because although she had wanted to develop her career, she felt that having a baby made that impossible in the short term. So she gave up work and dedicated herself to being a mother and the wife of a professional man. Her husband's job entailed travelling, so she and Alison went too.

Her second daughter, Catherine, was born four years later when they were living in Washington DC, USA. Mary found that the Americans had a different attitude to working women, and when Catherine was three months old she engaged a British nanny and went to work at the World Bank. Looking back she feels that this was very good for both children as they learned to establish themselves from an early age in a cosmopolitan society, and became very self-reliant.

After three years they came back to England, and, as far as Mary was concerned, back to 'square one'. No job, no child care, and a country which seemed prejudiced against career mothers unless financially necessary. It was then that her husband suggested that she study with the OU. She began in 1973. He has supported and encouraged her progress ever since and has himself become a tutor–counsellor for the technology foundation course.

When she began she had only the fuzziest notions of what might interest her. Psychology, she thought, and also environmental studies. So, she started with the foundation course in social science, and followed this with a geography course, and then the foundation course in technology because she had enjoyed the technical side of the geography so much. To her great surprise, she passed the technology foundation course and found that technology was not as difficult as she had feared. She then took the course in food production systems and passed this, as well as a design course. Without expecting it, she found she had chosen subjects she really liked, and was getting good grades. She enjoyed 'soft' technology courses enormously and when she discovered 'systems' she was hooked. She became interested particularly in human behaviour in the working environment and saw how psychology and systems might be a useful area in which to specialize. On one course she did a project on the possible health hazards of visual display units (VDUs), which has been very useful to her present job.

During this period Mary went back to work. Her children were older and not only understood her need for work outside the house but were actually supportive. She found also that her friends respected her for her commitment to study, but she suspects some thought she was a bit 'nutty' for doing it. One of the prices she found she paid for OU study was the absence of a social life between February and October, but it was all worth while when she gained her BA (Open) degree.

In her job as personal assistant to a research and development director in chemical engineering, Mary began to explore the opportunities to use her degree within the company. She tried to negotiate a job change or promotion, but her company were very critical of the OU. 'Sorry,' they said. 'We only take new graduates when they first come down from university and you are too old.' She explained that she had studied at the same time as doing her job efficiently but the only response she got was: 'If you want to do something like studying for a BA with the Open University, then it is entirely your decision; don't expect promotion as a result.' Needless to say,

she felt very frustrated. She had paid for her degree entirely out of her own pocket, taken annual leave in order to go to summer school, gone without family holidays and felt that she had a degree as good as the next person's, except that she had the added bonus of a lifetime's experience. Yet, there she was in her mid-forties, virtually consigned to the compost heap.

Mary decided to look for another company. She adopted a strategy of 'downward progress' in order to move upwards eventually and found a job with a firm of systems consultants as a technical assistant working on a C^3 (command, control and communications) project.

She had also gained a very supportive new boss. He was very impressed with her Open University qualifications and asked her about her specialist interests. When he learned that she was interested in human factors, he saw her potential in the company, since this was an area which would expand and in which they had no staff. So she got a more responsible job working specifically on human – computer interaction. Here was the opportunity she had been waiting for and where the systems, design and psychology courses in the OU had at last linked together to give her the right background for a new career.

For the first time in her life Mary felt that she was being paid for something which did not seem like work because she was enjoying it so much. There was so much more to learn in this new and expanding specialist area. Her company sent her on further courses and she kept up to date with all the appropriate technical publications. Very recently she left this job for a higher level post with a software house. She felt very disloyal about leaving, but the boss who had given her so much initial support counselled her to move on. 'You owe it to yourself to take advantage of this opportunity,' he said.

Mary's particular task in her new job is to design screen formats for VDUs, and study the keyboard design for computer systems. The basic aim is to get the working environment to the highest ergonomic standard in order to get the best performance from people. She does her work 'on site': that is, she visits places where new systems will be installed and she studies the people using existing systems. She draws on industrial psychology, but she also listens very carefully to the comments people make. 'Playing ignorant' she calls it. She thinks it is an advantage being a woman in such a role: people are happy to explain things to you in detail since they presume you don't understand. They also feel less intimidated by a woman and so feel free to be honest.

The advice Mary would offer to any woman thinking of following a similar path is to keep believing in yourself, and when you are trapped in a job where you are given no credit for any ability or potential, assert yourself and be determined. Your faith in yourself will not be misplaced. Don't worry if you don't really know what you want to do when you start. Working with different OU courses will help you find your main interest, and you will find progressive organizations who will recognize and respect your OU qualifications. She remembers the times when she felt like giving up her aspirations or her OU study. 'Be tenacious,' she advises. 'Recognize that it will be difficult but that you *can* do it. And it's worth it no matter how late. □

Ches Lincoln

At the time of writing Ches was finishing a course at Garnett College, London, and waiting to take up a full-time post as a technology course co-ordinator at the Open University's headquarters at Milton Keynes. So, unlike the other contributors to this booklet, she can say little about the job she is about to start since she knows only in theory what she will be doing: co-ordinating academic effort on course production and liaising with departments involved in all areas from publication to distribution, radio and television broadcasts, etc., in order to help get OU courses out. She has yet to see what this means in practice. She spent many years working in advertising and production before she became interested in technology, and won't find the experience of media production completely novel.

Ches is 41, divorced, has an OU degree, and has almost completed a certificate in teaching (for secondary and further education). She was educated at a London direct grant girls' school, which she got a scholarship to attend. She stayed there until she was 18 when she left with one 'A' level in English.

Ches's mother died during her final year at school, which partly explains her lack of 'A' level success, but even without this tragedy she admits she wasn't particularly motivated, and really saw her career as marriage and family. She knew her father did not want her to go to university anyway. She feels that one of the main reasons she was allowed to stay on at school was that she did a lot of housework and child care as the eldest girl in the family and she helped out in the small shop/post office her mother owned. She also feels that she was studying the wrong subjects — English, French and music. She would have liked to have done sciences but was discouraged, mainly because she was untidy and drew awful diagrams, whereas, on the positive side, she could write well.

In the early 1960s, when Ches left school, jobs were easy to find. She went to be a trainee librarian in a small library in Penge, south London. She was allowed to do a variety of jobs there, but she only stayed six months because she had a row with her father and left home to live with an aunt. She left the library and went looking for another job closer to where she was then living, and became a junior underbuyer for Great Universal Stores. She did not stay for long: soon she was fulfilling her ambition of marriage and motherhood by marrying the boyfriend she had been with since she was 15 and getting pregnant immediately. She stayed in the job until the imminent arrival of the baby meant that she had to leave. It was the automatic thing to do.

Ches didn't enjoy being at home, although she loved having children and had a second soon after the first. Her husband was a musician and the family had little money. Ches also found the reality of being a mother much less pleasant than her dream. She got a job soon after the birth of her second baby. Circumstances, combined with her own restlessness, forced her back to work. Money worries were pressing and her marriage was going wrong. Thus began a long period of Ches's life when she moved from job to job with little interest in her work while her personal life went through chaos and unhappiness.

Her first job was as a clerk/librarian with an oil company. Ches spent six months there, then she left her job, and her husband, and took the children to live first with her father, then in a flat close by. She got a job with Hamlyn, the publishers, and enjoyed the work. However, privately Ches was reaching breaking point trying to work, sort out her emotional life and look after her two children. She knew she wasn't giving them the affection and security they needed, and after some heart-searching she decided as a temporary measure that it would be best for the children if they were fostered. The arrangement worked much better than Ches had expected. The children were extremely happy with a foster mother who Ches felt was wonderful. During this period Ches's husband met someone else and had arranged his life so that when they became divorced he

wanted the children with him. Ches felt that she had not been the good mother that she wanted for her children and she couldn't see how, in the immediate future, she was going to be any better, so she allowed them to go. They have lived with their father and stepmother ever since, and although Ches has many regrets she still feels that this has been the best arrangement for them.

After 15 months with Hamlyn she was beginning to think about a career, but she was still very dependent on a man for her sense of self. So when her boyfriend moved to Preston and asked her to go with him, she gave up her job and went. In those days it was still easy to get jobs and she went to Littlewoods as only their second ever female manager. She was sacked from this, basically for being disorganized and undisciplined. She then went through a series of temporary jobs at the same time as her new relationship was breaking down. Ches suffered a nervous breakdown and went back to London, ironically to her old flat near her father and sister. She was by now totally insecure and lacking in confidence and when her father offered her the job of running the shop she took it. Eventually she was reunited with her boyfriend and they bought the business from her father and took it over.

This was in 1970, at the very beginning of the OU. Ches was aware of it because her customers came in to post materials and assignments. She wishes with hindsight that she had taken it up then: it would have been ideal for her — instead of reading novels during slack periods, she could have read units. However, she didn't feel capable of it. She had felt a failure since she left school with only one 'A' level, and all the people she had shared her life with since then had reinforced her sense of failure. After a while they sold the shop, because the area was being demolished and rebuilt, and business was poor. Ches had in the meantime been getting ill again; without realizing it she had become anorexic. It took her six months to recover, although it was some years before she managed to stop taking Valium. Ches got a clerical job in a small design studio, and as the studio expanded she took on more varied work there such as book-keeping and systems. She began to get interested in her work and acquire ambition. So she moved jobs again, and then again, now looking for somewhere where she could develop a career. In the meantime her second relationship ended.

Ches finally found herself working for John Haig, the whisky distillers, on advertising production. For the first time she created a life for herself by herself. She realized that for years she had been looking for personal security through her relationship with a man; now she began to find that security in herself. She threw away the Valium and made new friends, one of whom was beginning an OU degree in maths. He encouraged her to study. She thought of how much she enjoyed the technical aspect of her work and applied to do the technology foundation course. She had to wait two years before she began, and during this time she had a hysterectomy which ended twenty years of regular pain and illness. She began the technology course feeling like a new woman, physically well, full of high hopes, having ambition and a sense of personal security.

Her job 'took off', she was doing new and interesting work, and she was getting good grades in her OU assignments. She enjoyed studying so much that she wanted to spend all her time doing it, despite her now successful job with a high salary. She applied to Chelsea College to study an electronics degree full-time and was accepted, despite staff having reservations about her age. She was the only mature student on her course and one of only two women. She studied at Chelsea for two years but unfortunately failed some of the examinations at the end of the second year. Despite enjoying having the time to study she had not enjoyed the course. She found the teaching very different from the OU, and to her mind much inferior. She felt that the staff were working at making access to the field difficult rather than welcoming students in. She could have re-done the year, but would have had to support herself financially, so she decided to leave.

After her experience at Chelsea, Ches began to feel strongly about education so she applied to Garnett College, and on the strength of her imminent OU degree got accepted onto the teaching certificate course. She is interested in the whole idea of using new technology for teaching, e.g. computers, video, etc., rather than face-to-face class teaching. Teaching technology in secondary or further education is a field she recommends strongly for women at the moment because she is aware of the present shortage of teachers in these subjects. She was offered a job teaching technology in a college on the same day that she received the offer of a job with the OU. She still feels some guilt about not taking the teaching job, as she believes that if there were more women teachers of technological subjects both male and female students would cease to see technology as an exclusively male area.

Studying, both with the OU and full-time, has changed her social life over the last few years. Ches sees herself as the sort of person who goes overboard when she gets an enthusiasm. It used to be rock climbing and walking every weekend. Then it became the OU. Old friends saw her as an instant academic half way through her first course. She made new friends through the OU. When she chose maths and technology courses for her degree profile she felt she was doing unfeminine subjects, but not uncongenial ones. She also felt that she had been seen in the past by her employers as a woman in a man's place so that was not new to her. For women wanting to follow the same lines of study Ches recommends not being afraid of speaking out for yourself and not presuming the men in your study group know more than you. Don't be afraid of the maths, she advises: attack it head on — you will need it for a career in technology, and the OU courses will teach it to you.

For her own future Ches feels she is no longer interested in money or status. Her new job will begin at over £9000, but she thinks that if she had stayed with her advertising job she would have been earning twice this amount. For her, the most important thing is to enjoy and be interested in what she is doing, and feel it is useful. She has also sorted out her personal life and has a secure relationship with a man who has also been an OU student.

In two years' time she would like to do a higher degree in an aspect of educational technology, an area she hopes she will learn more about in her new job. At the moment she is simply bursting with enthusiasm to get going. □

Sue Davies

Sue Davies lives in Derby with her husband and her two sons aged 18 and 15. At 38 she is the software manager for 'Vistec', a company which produces computer systems and software for special purposes. These are usually in engineering applications, but the company is willing to attempt to find solutions to problems in other areas of industry. Sue has worked for Vistec for three years, one year of which as software manager. She works full-time, but with a flexible schedule, including long hours and trips away when necessary. Her life is full with her job, her family and commitments to local politics. Her qualifications are a BA (Open) and an MSc in mathematics. Unlike the other women in this book whose studies have been mainly in technological subjects, Sue's studies with the OU were all in maths, apart from her second foundation course, which was in arts. However, she has found herself working in a section of industry similar to that of many of the other women written about here.

Sue is in charge of a software development department. She is responsible for a team of six people who are engaged in writing software. She is concerned with the specifications for a program rather than doing the programming, although she has herself worked as a programmer. In practice, as in most small companies, people have to be willing to turn their hand to whatever is necessary. In this spirit she also gets involved in hardware and software engineering.

Her job as a member of a small team begins with writing an outline proposal for a job and designing a study for the customer and giving a quote. This is followed by a detailed specification for the job. She then sees that it is carried out. When the customer is some distance away she is obliged to travel. At the time of writing Sue was spending about one week in four in Aberdeen working on extending a system she originally designed. For all of this she earns over £14 500 plus bonuses and a company car. And yet, this was not the kind of job she foresaw for herself when younger or even when she was studying with the OU.

Sue went to a traditional grammar school, where boys tended to take boys' subjects, science, and girls took girls' subjects, arts. But she enjoyed maths and physics and was therefore not traditional. She left school with 'O' and 'A' levels and went to Bradford University to study physics. She had no career ambition at all that she remembers. She drifted into physics because the careers advice she got at school was that there was nothing to be done with a maths degree except teach, which she didn't want to do; so she took her other good subject. She did six months of the course at Bradford and left to get married. For a few years after that she was busy at home with two children: first Tony, followed three years later by Gareth. She was at first very happy at home with Tony. She planned to work sometime in the future but wasn't desperate to begin a career. But by the time she was pregnant with Gareth she felt she needed something to keep her mind active. A home and a baby were quite enough to occupy her time, but not her mind.

She applied to the OU and began the maths foundation course in the first year of the OU's life. She doesn't remember now where she heard about the OU; at the time it was in the news everywhere. Gareth was born in January 1970 and Sue began the course in February. It was a good time for her. Tony had just begun to attend a playgroup and the new baby slept for periods of the day. Sue's husband, Stan, had left a job in industry and had begun a lecturing job, which meant that he was more flexible and able to help with child care.

Sue found studying with the OU different from any of her previous experiences of education. The enthusiasm of the students in particular amazed her. She noticed this especially at her first summer school. Students questioned lecturers and seemed to take control of their learning rather than simply allow it to happen to them. And, at last, she had people to talk to about things other than

children and housework. She concentrated on pure maths during her OU study, and it is ironical given the work she does now that she wouldn't have anything to do with computing and didn't like applied maths much.

In her final year of study she got her first job, in the Civil Service as a tax officer. At the time the family needed some extra money. Tony was at school and Gareth had begun nursery. So Sue took the first job that came up. She'd gone to an employment office for advice but they seemed to think that without shorthand and typing only the Civil Service was open to her. She worked there for 18 months and then went to study an MSc in maths part-time at Nottingham University. She had thought about it for some time, and after an OU staff tutor made enquiries for her she applied. She gave up her job, and because she was not entitled to a local authority grant she applied to a special OU fund for help with tuition fees, which she got. She finished her MSc in 1977.

At that time Sue was not clear about what job she wanted to do, but she knew that she wanted to concentrate on maths. A fellow student was working at the British Rail Mathematical Applications Division at Derby. It sounded interesting, so she applied and got a job as a scientific officer. The work turned out to be almost entirely to do with computing. On her first day she was given a computer and a manual and she taught herself from scratch. Sue is entirely self-taught as far as computing is concerned. She believes that it is the logical approach that matters, and that there is little difference between abstract algebra and logical programming. After three years with BR she wanted to move on. Although she had a secure future in terms of progression up career grades, financial cuts at BR began to be felt, and there was little scope for interesting work. She felt she needed a challenge.

Sue got a new job almost immediately with a computer consultancy as a software engineer (also called an analyst programmer) and she stayed there for two years. The work was as challenging as she had expected but the company only had a small office in Derby and Sue felt that her career prospects were limited. She went to a specialist employment agency for computing, and got a job immediately, a job that Sue had not seen advertised anywhere else, with Vistec.

As far as the immediate future is concerned, Sue feels that she is ambitious in terms of her work, but not in terms of job titles. She doesn't want to go further into management. One day she might work for herself, perhaps setting up a software consultancy.

Sue has kept her connections with the OU. As a student she was involved with the Open University Students Association from its very beginning, as a local representative and then on national committees. She has also been a tutor on the maths foundation course summer school, and a part-time tutor for the *Analysis* course. However she had to give this up when her workload got heavier. These days she involves her employer with the OU, and two of the company's programmers are being sponsored to do a software engineering course.

Although there were always a few women on the OU courses she did, especially at the summer school, she never found the OU atmosphere sexist. She has found more sexism in industry, especially in engineering. She feels it's an automatic response among men in the field to register surprise when they find a woman doing the job. She finds that the prejudice seems allayed after she's had a chance to talk to people and demonstrate that she knows her job.

Sue also feels that a woman doing what is traditionally seen to be a male job must cultivate ways of working which are probably counter to what she would prefer to do. For example a woman must be more aggressive, must hold onto her sense of humour and must not show she is upset. If women are bad tempered it is because they 'cannot cope'; if men are bad tempered it is because they are 'under stress'.

Sue is very keen to encourage other women with families to study and make careers for themselves. She recognizes that there are always times when you feel guilty because you have taken time away from the children, but then this is countered because your wages mean that you can do things such as taking holidays, which you wouldn't otherwise have been able to do. 'Never', she advises, 'put yourself in the position of saying to your children "Look what I gave up for you"'. Sue also recommends pursuing every avenue for financial help: assistance funds within the university as well as possible local authority money.

As a manager in industry, Sue knows how hard it is to find people trained for jobs in new technology. The industry is still expanding and there are openings for women. She recommends them to you! □

Mary Shackleton

Mary is a lecturer in electrical and electronic engineering at Doncaster Institute of Higher Education and is in her early forties. Her qualifications, which she obtained from scratch in her thirties, while working full-time and bringing up her son, Christian, include a BA (Open) and an MPhil from Bradford University. She is still working on her PhD and a teaching certificate. She has had her present job since January 1985.

Mary was born in Bradford. Her family were not well off and her mother's ambition for her was to be a teacher. But Mary rebelled against this early on because she was not attracted to teaching. She left school with 5 'O' levels; an arts person who couldn't do maths and because of that couldn't do science. Her problems with maths began when she changed schools at the age of 11. The teaching in her grammar school was so different from that in her previous school that maths became a mystery to her. No one else seemed to understand her problem and she was too young to sort it out for herself. When she left school at 17 she had no ambition except to travel.

Mary's first job was as an all-round 'office person' for a tailor. She had no office training, but in those days her grammar school background was considered a good enough qualification. She worked there for a year and then got a job in the model salon of Marshall and Snelgrove, the Bradford department store, selling gowns. She enjoyed herself but didn't see the work as a career; at the back of her mind she expected to marry eventually and give it up. In the meantime she took a second job to earn money to travel. From 8.45 am to 6 pm she worked at Marshall and Snelgrove, and from 6.30 pm to 10 pm she worked as a cashier in a cinema.

When she had enough money, Mary went abroad for the first time as an 'au pair' to Paris, where she felt exploited and homesick. However, she did have enough money to support herself for six months as a student at the Sorbonne university, doing a special course in literature, philosophy and history for non-French people. During this time ambition began to grow in her. She came back to Bradford and began to study at evening classes. She had decided she wanted to be a doctor. However, the next few years of Mary's life forced her to squash her ambition for a while. She married and got pregnant. Her marriage proved to be unhappy and her first child, a daughter, was born handicapped and died as a toddler. She then had a son who, thankfully, survived. Meanwhile she became determined to pursue her own education.

She got a job as a technician at Bradford College, which offered her a day release to continue studying. Mary remembered childhood stories about people like the electricity pioneer, Michael Faraday, who began as a technician, and she hoped that this job could be a real new beginning for her, albeit rather less grand than Michael Faraday! She also felt that working in an academic environment was ideal for learning. She put her son in a private nursery. She knew he was happy and that he needed to mix with other children: they had been very isolated for the first few years of his life. Unfortunately one of the first things that happened when she began work was that her immediate boss denied her a full day of release and told her that she was only eligible for half a day. She had to go in and work one evening from 7.00 to 9.00 to make up for the 'extra' half-day release. It was only later when explaining the situation to the head of the science and maths department that she was told she was due a full day. The same head drew up a study timetable for her and gave her her first chemistry book. She chose to study all the subjects she had not studied at school and got a further 6 'O' levels. She then took 4 'A' levels – physics, chemistry, biology and general science, but she had overstretched

herself and failed physics and chemistry.

It was at this time, in her early thirties, that Mary was introduced to the OU by one of the college lecturing staff who suggested she went with him to an induction meeting he was attending. She began the science foundation course and then did electronics and instrumentation, because she saw that there was a lack of expertise in these areas in her department. The OU students and staff provided her with lots of support. She hadn't realized how isolated she had been. Now she found that fellow students were supportive and enthusiastic. No one ever suggested she was doing anything unusual or unfeminine and so she didn't see herself as doing so either. However, in other situations she found there was a generally hostile attitude towards working mothers, especially when her son was at school, and this attitude unfortunately often came from other women. Also she was always questioned by employers about her family responsibilities.

After she had achieved her BA (Open), a couple of the lecturers at Bradford University who were also OU tutors recommended Mary for a part-time MPhil at the School of Control Engineering there. She stopped her OU studies and continued at Bradford part-time, working in the evenings and weekends. In January 1982 Mary was awarded an MPhil for research involving the design of an electronic transducer. This instrument is currently enjoying some commercial success. Despite the success of her studies she could get no further promotion in her job. At this point she was offered the opportunity to do research at the University of Manchester Institute of Science and Technology by her former MPhil supervisor who had meanwhile obtained a professorship there.

Her initial contract was for three months, during which she was to write a project specification for a PhD and try to obtain financial support from industry for further research. She wasn't eligible for a normal Science and Engineering Research Council grant because of her age, and the fact that she didn't have a second class honours degree. Eventually she raised enough money to support two years' research, and Bradford College gave her two years' unpaid secondment.

After doing the full-time research at Manchester, Mary did not want to go back to work as a technician. She felt grateful to Bradford College, which had supported her through 'O' levels and 'A' levels and paid her OU and MPhil fees, but she wanted to move on. Some individual staff had given her lots of support but others seemed to see her as a technician stepping out of her station. It had been wonderful to be able to study full-time, although the money ran out before she completed her work for her PhD.

At the end of her time at Manchester, Mary still lacked confidence. She applied for lots of lecturing jobs but not in industry because she didn't think she had a chance there. She made at least ten applications without even receiving any replies. Then she got a three-month lecturing post at the Women's Technology Centre, Sweet Street, in Leeds. She enjoyed it tremendously but when the chance came for a permanent job at Doncaster she took that. She was also accepted as an OU summer school tutor in instrumentation. She regards arriving at summer school with a tutor's 'black badge' instead of the student's ordinary name badge as a real symbol of success.

At present Mary is extremely busy. She is persevering with her PhD research, although a bit half-heartedly, she admits. This isn't surprising since she is also completing a part-time teacher training course on top of her main job of teaching electrical and electronic principles and mathematics to Business and Technician Education Council students. Her timetable is such that she teaches some part of every day – which with a one-day release for her own teacher training course makes her life very full. However, she finds that she has marvellous job satisfaction.

Mary would like to spend a short time in industry because she feels the industrial experience would make her a more effective teacher. She foresees that her own career will continue in teaching, just as her mother might have wished, but in a very different field She has a special concern for women students. She would like to help develop innovative programmes for women, similar to those she worked on at the Women's Technology Centre in Sweet Street, Leeds. She believes that the most effective way to teach is by example. She applies that to herself and to her women students. Mary believes that in educating women you educate whole families. She remembers the pride she saw in her own son's face when she got her degree. That son is now at university and she hopes his attitudes towards women's achievements in science and engineering will be more progressive than is the norm.

In her department Mary is the only woman among 40 men. She found that they were reserved initially but are relaxing now. She had the entertaining experience of having to tone down *her* language in front of her male colleagues, because the atmosphere of Doncaster was rather more reserved than the liberated all-women environment of Sweet Street.

Looking back, she considers that her whole attitude towards life changed after she had children. It was having and caring for children that made her want to develop a career in which the values of caring mattered. For some people it might seem strange that this path led Mary to engineering, but she firmly believes that engineering is a 'caring' industry, and an industry which would benefit greatly if more women entered it. She has given talks to schools to encourage girls into engineering but she finds young girls very difficult to talk to, sometimes even antagonistic. For them engineering has a 'cloth cap' image, and they don't want to dirty their hands. She believes that we must change the learning environment and present technical subjects as creative and caring.

As her son is now away at university, Mary has more time to apply herself to her job and studies. During holidays the common ground they share in their studies has enhanced their relationship. She does not play down the hard work she has done, but she has enjoyed doing it. She feels it has all been worth it. She also appreciates how difficult it can be for women to organize their lives when they have dependent children and little support. When she first returned to work three-quarters of her salary went on childcare fees for her son. Now she has a good income, and uses it to develop her own life as an independent woman. She hopes that her own experiences will encourage women who are in less than ideal supportive circumstances to keep believing in themselves and persevering. □

Frances Day

Frances is a systems engineer for Hewlett Packard, the computer manufacturers, and is in her late thirties. She has been in her present job for two years and loves it. Her job is to give technical advice to customers on how to get the best use from their Hewlett Packard machines. Most of her time is spent in discussions with computer specialists. She is expected to work long hours and do a lot of travelling. In return her company gives a number of perks on top of a very good basic salary such as a company car in which she does about 20 000 miles a year, paid membership of BUPA, and a profit-sharing scheme.

And yet Frances left school at 16, and has spent a greater part of her working life as a secretary and part of it not working at all outside the home when her son, now 14 years old, was very young. Her qualifications are seven 'O' levels gained at school, one 'A' level gained later through home study, an Ordinary National Certificate in business studies and an OU degree (as yet 'ordinary' but she hopes eventually to get honours).

She left school after 'O' level exams at 16, having had her ambitions squashed. She had wanted to be an airline pilot but in those days there were no women airline pilots. So she tried to get an apprenticeship as an aeronautical engineer but no one wanted her. She didn't want to stay on at school; she hated it. Her parents persuaded her to train for secretarial work, so she decided to give up her unfeminine ambitions and become a 'proper woman' – a secretary. She got an ONC in business studies and then her first secretarial job at 17. She enjoyed the job as secretary to the managing director of an advertising company; it was fun and full of novelty. But she only stayed two years because she wanted to see more of the world, and was tempted by an advertisement for a job as an 'au pair' in the USA. It wasn't what she expected, she didn't like it and she wasn't good at it. At the end of three months she was sacked and packed off home. Frances later moved out of her parents' house, and went to live in Leicester. Her first new secretarial job, with the director of a sock warehouse, was short lived but her next, secretary to the technical director of a plastics factory, lasted for six years. She left because she had got married and become pregnant. For the first few years she enjoyed being at home with her baby but after a while she wanted more activity outside her home. When her little boy went to playschool, she joined the OU as a student on the technology foundation course, and started occasional temporary work to help to finance her studies.

Registering for this course launched Frances into the technical education she had wanted when she left school. She feels now that the OU was an excellent way for her to study, and at the time it also helped her regain the confidence she had lost while at home. After this she did the science foundation course, and enjoyed the physics part of it so much that for the rest of her OU career she concentrated on physics and electronics.

Frances found that even in the OU there was a resistance to women doing 'hard' technology and science. Tutors were sometimes patronizing and she often found herself the only woman at summer school or in her tutorial group. She had to make great efforts with the mathematical aspects of her studies. In the technology foundation course there were two different routes through the material: one of these, the 'non-mathematical' route, was usually recommended to women. Despite this, she chose the mathematical route, and felt the struggle was worth it because it was necessary for her to master the maths to take the second and third level courses that interested her. She feels that she was never an exceptional student, but she enjoyed the subjects. She enjoyed studying so much she made the mistake,

as she now sees it, of going full-time into a degree course at Loughborough to study physics and electronics. She describes it as a disaster. She failed her first year exams and failed a resit exam, after which she came back to continue with the OU. She now thinks it was a mistake to try to incorporate full-time study with a home and child care, and wants to warn other women thinking of doing something similar to be very careful.

When her son was older, Frances returned to work but she was determined to get out of secretarial work. She had been trying to change directions since she was about 20 by applying for other jobs within her company. But she was a good secretary and people wanted to keep her; she also had a problem trying to make them take her seriously. For example, she took an aptitude test to be a systems analyst but, although she passed, the company wouldn't take her on. She feels she benefited from the break of being at home because she was able to reassess her ambition and become more determined.

Frances saw an advertisement for the Control Data Institute who were running courses with TOPS (Training Opportunities Scheme) for computer engineering. She applied and did well in the aptitude test but she was offered a course in programming rather than engineering. She took the six-months TOPS course offered, and feels that it was a very enjoyable course with high standards, and passing it gave her self-respect. Throughout this time she carried on with her OU degree.

At the end of the course Frances was taken on as a programmer by Boots, the chemists, among their graduate intake. She feels that she was accepted on the strength of her TOPS course rather than the OU work, although she feels the employers saw her OU study as a good indicator of self-motivation and discipline.

She was with Boots for two years, during which time her marriage ended. She left her son with his father and took a job in Cardiff with the British-based factory of L'Oreal, the international cosmetics company. She and one other person ran the computing side of the business. She was there for two years until she moved into her present job.

Frances would encourage other women to try similarly to fulfil their ambitions but she is very clear about some of the drawbacks. She believes that women need to be tenacious, and they have got to work out their own priorities, separate from their family priorities. If they have other, especially family, commitments they must think very carefully and realistically about what they intend to do. Women must be as professional and committed to the job as a man doing it would be, and they need a supportive relationship at home. Her colleagues are a lot younger and will go further in their careers than she will, but Frances doesn't want to go into management. She feels that she has had enough experience of all sorts of things to know that she is now where she wants to be.

Her present job is very demanding and she thinks that it is very important to have a supportive relationship with a partner who shares all the responsibilities of running a home. She is away a lot, and she often works late. However, she feels that this is the price of a professional career, although the compensation is that she can be flexible when she has no appointments or clients to see. She estimates that a very small percentage of systems engineers are women, and she knows of only one woman with children. On the other hand the men are usually married with children. Although her son now lives with her ex-husband, she finds it difficult during school holidays when she wants to spend time with him but still has her work commitments.

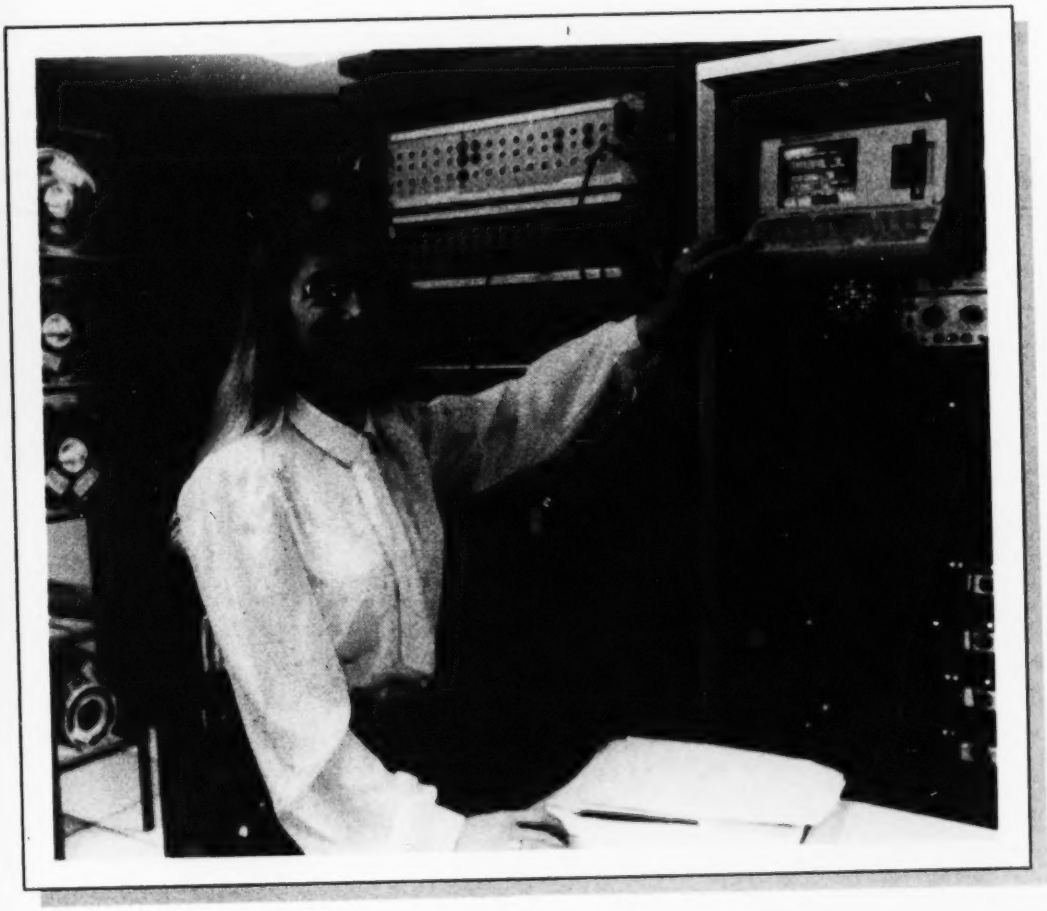
Although she feels that she has been treated well by the company, there is still resistance to her, as a woman, from some of her clients. Part of her job entails entertaining in pubs and restaurants, and she finds that this situation is quite smooth as long as the discussion is work related, but male clients don't seem to know what to talk about when the topic of work runs out.

One of the saddest things that Frances has found is the barrier her work has set up between her and other women. Some women find her intimidating because she is a technologist, others feel she has joined the men and sold out to big business. She finds it hard to make friends with women because of this and has only a few close friends. She feels strongly that women need to be more supportive and encouraging to other women who are entering non-traditional areas.

One practical piece of advice she gives is not to be ashamed of your age. You may be older than other applicants for the job, but if you are good it won't matter. Have confidence to make applications and when the advertisement has an age limit, ignore it. She has found that the employer will usually shortlist the best candidates whatever their age and you are just as likely to get an interview.

Frances hopes to concentrate in the future on developing a technical expertise in a particular field. Her employer gives her the opportunity for continual training. She also intends to get her OU honours degree, but slowly at a half-credit a year. She still makes time for OU study because she enjoys it. She is currently taking the course entitled *The Changing Experience of Women*. She also regards the OU as having been crucial in her career. It was the support she got from other students and self-help groups when she had lost confidence herself that got her going again, and made her even more determined to find the career that suited her. □

Joyce McBride



Joyce McBride won an Open University prize for being the best student in the technology foundation course in 1984, an achievement she is very proud of, especially since her only other academic qualifications are secretarial ones, and this was only the second OU course she had taken.

Joyce lives in a rural area of north-east England with her German shepherd dog, her cat and her husband, Mike. She is 33 and works as a computer programmer for Cummins Engine Company, who produce diesel engines for trucks and buses in their Darlington factory. She works with a team which includes two other programmers and a systems analyst who liaises with manufacturing engineers. They write computer systems from scratch for the manufacture and assembly of new engines. She works a 37½ hour week on flexi-time and her present salary is on the payscale £9641 – £13 500. However, she has only worked as a programmer for a few months. For most of her working life she has been a secretary.

Joyce left school at 15 with no qualifications and no clear idea of what she wanted to do. Her mother had died when she was 11 and her father died just before she left school. Looking back she sees that the death of her parents, and in particular her mother, disoriented her so that she never settled into school work after she was 11. Joyce went to live with her sister and it was only then, when her sister asked her what she inteded to do, that she begun to think about a job at all. At first she had no work at all and then she was offered a job as an assistant in Boots, the chemists. She suddenly thought with dismay: 'Is this going to be my life?' So she registered for evening classes in English, shorthand and typing, having decided that being a secretary would be a better option.

At 18 Joyce was offered a job as an office junior in a large garage. She enjoyed her job and got a good grounding in a range of office work; she even learned to drive. She was promoted rapidly, first to be the sales manager's secretary and then to deputize for the general manager's secretary. She describes this as being due to the fact that she was 'pushy' and confident. She thought she could do the jobs and so applied for them. At the same time she was doing well in her evening classes. She kept them up for nearly five years reaching 110 words a minute shorthand and 60 words a minute typing, as well as English qualifications. All the time Joyce had a dream that a wonderful job as a personal assistant to someone exciting (or something similar) waited for her.

Despite enjoying the garage Joyce left after three years. She was bored, but also fed up with having to work on bank holidays and with the atmosphere of sexual harassment that the secretaries had to put up with. She went to a small quantity surveyor's office where she worked as part of a small happy team for two years. However during this time she got married and needed to earn more money, so she went to work as a senior typist for the county council. She detested it, working all day in a typing pool doing audio-typing.

After 18 months Joyce applied for a transfer to the local police constabulary training school, and she found herself again in a job where she had some scope to develop her potential. It was in this job that Joyce had her first experience of working in computers. Her boss was engaged in linking Cleveland to the police national computer and Joyce found this very interesting. Her boss was studying with the Open Univeristy and tried to encourage her to register too but at the time she didn't have the confidence that she could do it. Good jobs often seem to have short lives, and this was no exception. The unit she was working with closed down and staff were transfered to other offices at quite a distance. Joyce's

husband, Mike, was working at that time at Cummins: he saw a stenographer's job coming up, so she took it.

At first this new job was mundane, but Joyce stuck with it because the pay was good. After two years she found herself working for another good boss who encouraged her to learn word processing. She realized that in order to go further in her career she needed qualifications. She thought she would have to begin at the bottom with 'O' and 'A' levels. This time it was her husband who suggested the OU. Joyce went to an Open Night at Teesside Polytechnic and met another secretary there who was successfully doing OU courses. This was the spur she needed. Her company offered to sponsor her, which meant that they paid her course fees and summer school expenses.

When her boss moved on Joyce applied for a job within the company as a data-process co-ordinator. The usual route to this job was through working as a computer operator or a data clerk. Joyce got the job when she had just enrolled with the OU. She was the first woman in the company to hold this position. Initially she was put in as a trainee for six months, but she ended up doing the job for three years. During this time she studied. Her first course was the foundation course in social science. Her success in this course gave her the confidence to do the technology foundation course. When she was at school she had no interest in science or technology. She had decided that she was hopeless at physics and maths and had always felt that English was her best subject. Joyce's experience of computers and her husband's enthusiasm for the technology course, which transferred itself to her, encouraged her to believe that she could do it.

Joyce's attitude towards study changed while she was doing the technology course. She began by regarding the OU as a means to an end – to get out of a dull job. However, as she did the course she found the work hard but extremely rewarding. She found her knowledge and understanding were increasing in leaps and bounds. Because she had no background in any of the subjects she had to study every page of the material. At times she had to ask for help from her husband, but by the end of the course she was helping fellow students in her tutor group. But getting the prize for the course was totally unexpected. The following year Joyce studied two systems courses, and the next year she completed an economics course and a statistics course.

Doing her OU work on top of her job has had a dramatic effect of Joyce's private life. The amount of time she has available to see friends and relatives is very small, and she feels that she has to try and make up during the October to February break for all the times she hasn't been in contact the rest of the year. She has, however, made friends through her courses, especially at summer school.

During all her studies Joyce has had Mike's support and enthusiasm; he has a Higher National Diploma in mechanical engineering. His support is practical in that he does a lot of household chores while Joyce studies. He has always said that he was tempted to do an OU course himself, but has never found the time.

Joyce is ambitious. During the years when she was working as a data-process co-ordinator she got to know the job inside out and felt that she wanted to move on. Her first application to be a computer programmer was refused, but she was eventually accepted. During the few months she has been in this job the company have given her extensive training through external courses and through the time spent with her by the team leader. She is now conscious of being a woman in a man's job. She is only the second woman programmer taken on by the company. Under a previous manager the systems department had not taken on any women computer operators, analysts or programmers. The first woman programmer was employed by the present new manager in the summer of 1985 and Joyce was employed a few months later when she had completed the two OU systems courses that she was studying. However, it's worth noting that five other programmers, all male, were employed in the same period. She has a feeling that people don't like women in these jobs, and she feels that she has had to work hard to be accepted, having to be a little bit better than the others. She loves her work and wants to keep moving on. The next step in a few years' time would be to become a systems analyst.

Joyce doesn't regret coming to study so late. She feels that when younger she would have been too immature and would not have got very much out of it. Her advice to other women is to join the OU, find the area that interests you and you will be successful. In particular, don't worry if you did badly at school. Distance teaching with the Open University is quite a different experience and you will be treated as an adult and an equal. □

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